

EXHIBIT I

Sur – Rebuttal Report
W.R. Grace Bankruptcy Matter
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I am submitting this sur – rebuttal expert report in the W. R. Grace Bankruptcy matter.

The report will include the following essential components:

- 1) Results of our analysis of the ATSDR chest radiograph study with correlated pulmonary function data with specific emphasis on the findings as they relate to the impairment and radiographic criteria set forth in the TDP.
- 2) Results of our analysis of the Whitehouse patient population lung function data when all available lung function data points were assessed as opposed to analyzing two lung function data points for a limited group of patients.
- 3) A detailed analysis of the CARD mortality study, including chest radiographic findings and pulmonary function data. This was important to analyze given that much of Dr. Whitehouse's comments in his most recent report and depositions are based on his CARD Mortality study.

I. THE ATSDR ANALYSIS

The ATSDR conducted a health screening study in 2000 and 2001 in order to characterize the chest radiographic findings in Libby, Montana. The ATSDR conducted spirometric tests on this population as well that was not reported. Our group analyzed these data

to characterize the nature of the pulmonary function changes seen, if any, and to verify the claim of Dr. Whitehouse that “A hallmark of pleural disease from Libby asbestos exposure is that it is highly progressive” (Expert Report of Dr. Alan C. Whitehouse, page 28). Despite his assertion that “no pulmonologist would use blunting to determine a diagnosis of asbestos pleural disease” (Expert Report of Dr. Alan C. Whitehouse, page 57), we defined diffuse pleural thickening (DPT) as necessarily including costophrenic angle obliteration (CAO), as outlined by the 2000 International Labour Organization (ILO) guidelines. DPT with CAO is not only an important radiographic finding by itself but also an indicator of a physiologically significant finding that correlates well with impairment.

METHODS

The ATSDR database from the Libby Community Environmental Health Project included nine SAS datasets associated with data collected from the ATSDR survey of the residents of Libby, Montana. Our study included all surveyed individuals between 25 to 90 years of age who had demographics and spirometry and who had an x-ray reading.

Within these groups, each of the 2 reading protocols (any reader or consensus reading) is treated separately. A third reader was used only when the first 2 readers disagreed. Neither gender nor smoking status is shown in these tables, but each was a significant contributor to the association between x-ray finding and pulmonary function. Since the extent & width filter does not apply to the profusion category or normal category, this area of the table is blacked out but the impairment analysis remained.

Column definitions are:

- DPT with CAO means any reader (or same 2 readers for consensus) reads both DPT and CAO, excluding those with a consensus Profusion $\geq 1/0$ or Effusion,
- DPT without CAO means any reader (or same 2 readers for consensus) reads DPT but no CAO, excluding those with a consensus Profusion $\geq 1/0$ or Effusion,
- Pleural abnormality excluding those with a consensus Profusion $\geq 1/0$, DPT, CAO, or EF,
- Profusion $\geq 1/0$ does not consider any other radiographic finding, and they could also have DPT, CAO, EF or Calcification, and
- Normal excludes those with consensus profusion $\geq 1/0$, any pleural findings or EF

Another important part of our analysis was to determine the usefulness of the Grace TDP with regard to diffuse pleural thickening. To summarize, the TDP included the following criteria with regard to lung function and radiographic description of the observed pleural findings:

- Impairment requirement ($FVC < 65\%$ and $FEV1/FVC > 65\%$),
- Extent and Width requirement (Any Extent ≥ 2 and Width $\geq a$),

The data is then presented in each table in one of two ways:

- One, an individual first meets impairment criteria and then extent and width requirements,
- Two, an individual first meets extent and width requirements and then meets the impairment criteria.

RESULTS

There are 3 sets of tables describing the ATSDR population.

Table 1 (Consensus Reads)

DPT With CAO Excl Prof & EF		DPT Without CAO Excl Prof & EF		Pleural Abnormality Excl Prof, DPT, CAO & EF		Profusion \geq 1/0		Normal	
N	%P FVC	N	%P FVC	N	%P FVC	N	%P FVC	N	%P FVC
53	83.08	0	-	710	94.98	54	79.96	5343	102.96

Table 1A (Any Reader)

DPT With CAO Excl Prof & EF		DPT Without CAO Excl Prof & EF		Pleural Abnormality Excl Prof, DPT, CAO & EF		Profusion \geq 1/0		Normal	
N	%P FVC	N	%P FVC	N	%P FVC	N	%P FVC	N	%P FVC
124	83.45	4	75.25	1241	96.25	147	88.93	5343	102.96

Table 2 (Consensus Read)

		DPT With CAO Excl Prof & EF	
		N	%P FVC
Meets Extent & Width Requirement	Yes	30	76.26*
	No	23	91.98*
	Total	53	83.08

* %PFVC significantly reduced (1-sided $p = 0.0006$) for those with DPT with CAO and meeting the extent & width requirement compared to those not meeting the extent & width requirement

Table 2A (Any Reader)

		DPT With CAO Excl Prof & EF		
		N	% of Total	%P FVC
Meets Extent & Width Requirement	Yes	76	1.22	80.65*
	No	48	0.77	87.88*
	Total	124	1.99	83.45

%PFVC significantly reduced (1-sided $p = 0.0318$) for those with DPT with CAO and meeting the extent & width requirement compared to those not meeting the extent & width requirement

Table 3 (Consensus Read)

DPT With Blunting		Also Meets Extent & Width		Also Meets Impairment	
N	%P FVC	N	%P FVC	N	%P FVC
53	83.08	30	76.26	8	57.35

Table 3A (Any Reader)

DPT With Blunting		Also Meets Extent & Width		Also Meets Impairment	
N	%P FVC	N	%P FVC	N	%P FVC
124	83.45	76	80.65	16	55.24

Regardless of what method of x – ray interpretation was used (consensus vs. any reader finding an abnormality), some common findings emerged from these data. First, the percent predicted FVC (%PFVC) was significantly reduced for those with DPT and CAO and who met the extent and width requirement, compared to those who did not meet the extent and width requirement. This finding was most pronounced in the analysis that used the consensus x – ray interpretation method (Table 2).

Second, as demonstrated in all of the ATSDR analyses, very few individuals had diffuse thickening of the pleura without CAO.

The next set of analyses involved the application of the Grace TDP criteria regarding diffuse pleural thickening to the ATSDR population.

Table 4 (ATSDR Any)

		DPT With CAO Excl Prof & EF		
		N	% of Total	%P FVC
Meets Impairment Requirement	Yes	19	0.30	55.47
	No	105	1.68	88.52
	Total	124	1.99	83.45
Meets Impairment & Extent & Width Requirements	Yes	16	0.26	55.24
	No	3	0.05	56.72
	Total	19	0.30	55.47

Table 4A (ATSDR Any)

		DPT With CAO Excl Prof & EF		
		N	% of Total	%P FVC
Meets Extent & Width Requirement	Yes	76	1.22	80.65*
	No	48	0.77	87.88*
	Total	124	1.99	83.45
Meets Extent & Width & Impairment Requirements	Yes	16	0.26	55.24
	No	60	0.96	87.43
	Total	76	1.22	80.65

* %PFVC significantly reduced (1-sided p = 0.0318) for those with DPT with CAO and meeting the extent & width requirement compared to those not meeting the extent & width requirement

Table 5 (ATSDR Consensus)

		DPT With CAO Excl Prof & EF		
		N	% of Total	%P FVC
Meets Impairment Requirement	Yes	10	0.16	56.11
	No	43	0.69	89.35
	Total	53	0.85	83.08
Meets Impairment & Extent & Width Requirements	Yes	8	0.13	57.35
	No	2	0.03	51.15
	Total	10	0.16	56.11

Table 5A (ATSDR Consensus)

		DPT With CAO Excl Prof & EF		
		N	% of Total	%P FVC
Meets Extent & Width Requirement	Yes	30	0.48	76.26*
	No	23	0.37	91.98*
	Total	53	0.85	83.08
Meets Extent & Width & Impairment Requirements	Yes	8	0.13	57.35
	No	22	0.35	83.13
	Total	30	0.48	76.26

* %PFVC significantly reduced (1-sided $p = 0.0006$) for those with DPT with CAO and meeting the extent & width requirement compared to those not meeting the extent & width requirement

DISCUSSION: ATSDR ANALYSIS

A primary focus of our study of the ATSDR data was to determine if there was any functional significance associated with the radiographic abnormalities that were present. With regard to being sure the radiograph actually shows DPT, we included in our definition of DPT as necessarily including CAO. This is not only the viewpoint of the International Labour Organization in its 2000 Classification scheme but also supported by the medical literature. For instance, Ameille and colleagues addressed a very similar issue in their 2004 publication. By using a definition of DPT as being necessarily associated with CAO, the researchers found that agreement among readers was significantly better. Furthermore, because CAO commonly occurs as a result of a pleural effusion and leads to fusing of the visceral and parietal pleural surfaces that is the pathophysiologic hallmark of DPT, it make sense then to include CAO as a necessary element when making a radiographic diagnosis of DPT. Also, as in our study, a

similar reduction in lung function has been found when CAO and DPT are considered separately, lending credence to the idea that the two findings result in the same functional consequences.

In our analysis of the ATSDR dataset, we investigated the associations between lung function and X-ray findings, resulting in the following conclusions:

- 1) Lung function was reduced in individuals with DPT and CAO (but no other radiographic finding) if the individual met the extent and width requirements of the TDP but not, on average, in those who did not meet these criteria.
- 2) Pleural abnormalities without other radiographic findings did not generally lead to lung function loss.

Given the findings of our analysis, with regard to those with DPT, those who meet the impairment criteria of the TDP are likely also to meet the extent and width requirement as well. Therefore, based on these data, the extent and width criteria are important first criteria in determining who is, and who is not, likely to be impaired criteria, and these radiographic criteria should be used as an initial screen to determine who qualifies for compensation under the guidelines of the TDP.

II. The Whitehouse Patient Population

In previous reports, I have discussed the methodological flaws in the Whitehouse (2004) progression study. In this section, I will present data regarding the availability of lung function data in the Whitehouse patient population and the results of our analysis when all of the available data was assessed.

A. Patient Groupings

- **WPS:** Whitehouse progression study population as reported in his manuscript and based on only 2 lung function data points per individual,
- **WPSAD:** WPS with all available PFT data (less than 1/3 of the available tests were presented in the Whitehouse manuscript),
- **ALL PATIENTS:** LP, L550, LE, and CARD patients including the WPSAD, and
- **ALL-WPSAD:** All patients excluding WPSAD.

Tables 6 and 7 show for the various cohorts defined above the number of subjects, percent predicted lung function, the number of lung function data points and length of follow-up over which we computed annual change in lung function.

Table 8 shows annual changes in lung function, by cohort, for those individuals with a “minimum” of 2 tests over at least 2 years. As demonstrated by the data, the lung function loss, if present, observed in the categories other than the WPS is much smaller than that described in the Whitehouse study population and is clinically insignificant.

TABLE 6:
N SUBJECTS AND FIRST TEST AGE
By Whitehouse Cohorts With And Without Slopes

COHORTS ASBESTOS POPULATION INCLUDED	N SUBJECTS		FIRST TEST AGE	
	ALL	With SLOPES	ALL	With SLOPES
WPS*	123	123/71*	57.33/66**	57.33/66**
WPSAD	123	110***	57.89	56.64
ALL - WPSAD ^F	667	476	59.70	59.14
ALL PATIENTS ^F	790	586	59.42	58.67

Note: Any non-tremolite asbestos and indeterminate exposure population included

TABLE 7:
AVG NUMBER OF TESTS USED AND AVG LENGTH OF FOLLOW-UP YEARS
For Those with Slopes

COHORTS	Average Number of Tests/Subject				Average Length of Follow-Up Years/Subject			
	FEV1	FVC	TLC	DLCO	FEV1	FVC	TLC	DLCO
WPS*	NA	2	2	2	NA	2.91	2.96	2.90
WPSAD	8.02	8.02	7.05	7.28	8.21	8.21	7.67	7.86
ALL-WPSAD	5.07	5.07	4.88	4.84	4.81	4.83	4.68	4.61
ALL PATIENTS	5.62	5.62	5.28	5.29	5.45	5.46	5.24	5.21

Note: Any non-tremolite asbestos and indeterminate exposure population included

TABLE 8:
AVG ANNUAL CHANGE IN %P PFT
By Whitehouse Cohort Category

COHORTS	Annual Change in % Predicted			
	POST- %PFEV1	POST- %PFVC	%PTLC	%PDLCO
WPS*	NA	-2.2	-2.3	-3.0
WPSAD	-0.703	-0.752	-0.719	-1.713
ALL - WPSAD	-0.494	-0.628	-0.070	-1.619
ALL PATIENTS	-0.533	-0.652	-0.192	-1.636

Note: Any non-tremolite asbestos and indeterminate exposure population included

*** As reported in the Whitehouse manuscript**

III. CARD Mortality Analysis

We performed an analysis of the data that supported the CARD mortality study performed by Dr. Whitehouse and submitted in a previous report. Our analysis involved applying the Grace TDP criteria to the CARD mortality study population in order to determine the inclusiveness of the criteria and, importantly, if any individuals were excluded and had an asbestos related impairment.

In order to perform this study, we used the data supplied in the file for “CARD Deceased ARPD 79 Distribution” and organized the findings, shown as Table 9 below, which had the following dimensions:

Column definitions are:

- DPT with CAO, excluding those with profusion category $\geq 1/0$ or a pleural effusion (EF)

- DPT without CAO, excluding those with profusion $\geq 1/0$ or a EF
- Pleural abnormality excluding those with profusion $\geq 1/0$, DPT, CAO, or EF

Row definitions:

- Meets Impairment requirement (FVC or TLC $\leq 65\%$ P and FEV1/FVC $> 65\%$),
- Meets Extent and Width requirement (Any Extent $\geq 25\%$ and Width ≥ 3 mm),
- Analyzed in a step – wise fashion: first, meets Impairment and then Extent and Width requirements, and second, meets Extent and Width and then Impairment requirements

TABLE 9
CARD MORTALITY POPULATION (TOTAL N=79)

		DPT With CAO Excl Prof & EF			DPT Without CAO Excl Prof & EF			Pleural Abnormality Excl Prof, DPT, CAO & EF		
		N	% of Total	%P FVC	N	% of Total	%P FVC	N	% of Total	%P FVC
Meets Extent & Width Requirement	Yes	11	13.92	68.18	9	11.39	77.89			
	No	2	2.53	88.00	0	0	-			
	Total	13	16.46	71.23	9	11.39	77.89			
Meets Extent & Width & Impairment Requirements	Yes	5	6.33	47.60	3	3.80	51.67			
	No	6	7.59	85.33	6	7.59	91.00			
	Total	11	13.92	68.18	9	11.39	77.89			
		DPT With CAO Excl Prof & EF			DPT Without CAO Excl Prof & EF			Pleural Abnormality Excl Prof, DPT, CAO & EF		
		N	% of Total	%P FVC	N	% of Total	%P FVC	N	% of Total	%P FVC
Meets Impairment Requirement	Yes	5	6.33	47.60	3	3.80	51.67	1	1.26	49.00
	No	8	10.13	86.00	6	7.59	91.00	3	3.80	75.33
	Total	13	16.46	71.23	9	11.39	77.89	4	5.06	68.75
Meets Impairment & Extent & Width Requirements	Yes	5	6.33	47.60	3	3.80	51.67			
	No	0	0	-	0	0	-			
	Total	5	6.33	47.60	3	3.80	51.67			

With regard to the CARD Mortality data table shown above, a few comments can be made. First, the entire cohort is small ($n = 79$) and therefore the statistical power of our analysis is low, particularly within any one radiographic category. Nonetheless, we present an analysis of this cohort in order to test the impairment and radiographic criteria as set forth by the Grace TDP, specifically to determine how many individuals are excluded from compensation by these criteria. We then further will present specific medical information about those individuals, some of whom do not meet the Grace TDP criteria, in order to determine what, if any, medical condition(s) might explain their impairment, if present, and/or their radiographic abnormalities, if present.

Second, with regard to impairment, 5 of 13 with DPT and CAO met the TDP criteria and these 5 had markedly reduced lung function ($FVC = 47.6\%$ predicted). Conversely, if one considers those 9 individuals with the Whitehouse definition of DPT (as not necessarily including CAO), only 3 met the impairment criteria, consistent with the medical literature which has demonstrated that CAO is a useful marker of impairment for an individual with DPT. Of note, all 3 of these individuals also meet the extent and width criteria as put forth in the Grace TDP.

Third, if one reverses the order of the screening process and considers extent and width criteria first, the extent and width criteria removes 2 of the 13 individuals with DPT and CAO. Applying the impairment screen reveals that 5 of the remaining 11 individuals with DPT and CAO also meet the impairment requirement. It is important to note that while using the extent and width requirement screen reduces the number of individuals by 2, it does not exclude any of the individuals with DPT and CAO who also have impairment, as all 5 of the 13 individuals with

DPT and CAO, who have impairment, also meet the extent and width requirement. This runs contrary to the suggestion that including an extent and width requirement to the TDP would exclude people in Libby with DPT and severe impairment.

While the information derived from the CARD Mortality Table presented above is useful, specific medical analysis of the individuals involved is important, given that non-asbestos related lung conditions could lead to a particular individual meeting the Grace TDP criteria, which were designed only for individuals suspected of having an asbestos-related lung condition. Therefore, presented below is medical information specific to the individuals involved, grouped according to the CARD Mortality Table presented above. As can be seen, not all individuals had readable radiographic images for my review.

DPT with CAO (excluding profusion > 1/0 and pleural effusion) Who Met Impairment Criteria (n = 5)

- Lois Bennett
- Richard G Davidson
- Glenn M. Johnson – This individual had a left sided effusion, an enlarged heart, and sternal wires. He had no CAO on the right side.
- Donald A Riley
- Andrew J Wright

DPT with CAO (excluding profusion > 1/0 and pleural effusion) Who Did Not Meet Impairment Criteria (n = 8)

- William J Badgley
- Percy H Baker – This individual had minor pleural changes, a sternotomy and no evidence of CAO.
- HLC
- Jack O DeShazer – This individual had no DPT, no CAO, and a few en face plaques.
- Charlotte E Orr – This individual has huge pleural effusion and multiple pleural plaques. Rule out mesothelioma.
- Harrison E Thompson – This individual has multiple plaques and unilateral CAO that does not meet extent and width criteria.
- William F. Watt – This individual has volume loss on right, no DPT, and no CAO.

- Gynell D Kujawa - This individual has multiple plaques unilateral minor CAO (does not meet extent and width criteria).

DPT with CAO (excluding profusion > 1/0 and effusion) that do not meet spirometry impairment but meet %PDLCO (<65%) impairment

- Gynell D. Kujawa – This individual has multiple plaques, unilateral minor CAO (does not meet extent and width criteria).
- Charlotte E Orr - This individual has a huge pleural effusion and multiple pleural plaques Rule out mesothelioma.
- William J Badgley
- HLC
- Harrison E Thomspson - This individual has multiple plaques and unilateral CAO (does not meet extent and width criteria).
- William F. Watt – This individual has volume loss on right, no DPT, and no CAO.

DPT without CAO (excluding profusion > 1/0) and effusion; impaired (n = 3)

- Monte G Bennett
- Lois M Shea – This individual has an enlarged heart and no pleural disease.
- Frank E Shockley, Sr.

DPT without CAO (excluding profusion > 1/0 and effusion); not impaired (n = 6)

- Kenneth E Hutton – This individual has not DPT and no CAO.
- Deloris M Keller
- RHK
- Bob Wilkins – This person had Congestive heart failure. This individual has sternal wires and a pacemaker .
- OCR
- John M Urdahl – This individual has no CAO or DPT and multiple plaques.

DPT without CAO (excluding profusion > 1/0 and effusion) that did not meet spirometry impairment but meet %PDLCO (<65%) impairment

- Richard Kenelty – This individual is extreme obese and has no DPT.
- Hutton Kenneth E – This individual has no CAO or DPT.
- Urdahl John M – This individual has no CAO or DPT but multiple plaques.

Pleural (excluding profusion > 1/0, DPT, CAO and effusion); Impaired

- Mildred M Baker – This individual has multiple plaques but no CAO or DPT.

Pleural (excluding profusion > 1/0, DPT, CAO and effusion); not Impaired

- Dean v Adkins – This individual has pleural plaques (minor on diaphragm, pericardium).
- Francis E Cole – This individual has pleural plaques (minor).
- Lavina L McNair – This individual has multiple pleural plaques but no CAO or DPT.

Pleural (excluding profusion > 1/0, DPT, CAO and effusion) that do not meet spirometry impairment but meet %PDLCO (<65%) impairment

- Lavina L McNair – This individual has multiple pleural plaques but no CAO or DPT.

Discussion: CARD Mortality Study

Before discussing any conclusions from our analysis of the CARD Mortality study, there are important limitations in these data. Most significantly, this is an analysis of a patient population that has sought medical care for a breathing related problem. Therefore, by its nature, the group is defined by having a respiratory issue. This is important because this way of defining a cohort inherently has an important selection bias: the group studied is likely different from the population as a whole, most of whom do not have a respiratory problem and have not sought medical attention. This factor makes the CARD Mortality Study different from the vast majority of occupational mortality studies, which define an exposure or occupational setting, and then attempt to characterize morbidity or mortality in that specific exposure setting. Further, this also then makes the Whitehouse comparison of his study to the Selikoff insulator mortality studies invalid, given that the Selikoff studies were performed on a group of workers who were defined by their exposure, not by the presence of a respiratory disease. For this reason, the two studies are not comparable. Finally, comparing the x-ray findings and lung function levels in the CARD Mortality Study population to the x-ray findings and lung function levels in the population screened by ATSDR in 2000 and 2001 (which included a large portion of Lincoln County residents) reveals that the CARD Mortality Study is in no way representative of the population of

Libby, and the findings in the CARD Mortality Study cannot be extrapolated or applied to the greater Libby population.

Even with the limitations of the dataset upon which the Whitehouse CARD Mortality Study was based, a few general comments can be made. First, as has been observed in previous reviews of the Whitehouse patient population radiographic interpretations, inaccuracies in the classification of the films has led to improper groupings of the individuals studied. For instance, most of the individuals who were said to have DPT with CAO (the proper definition of DPT) and who were not impaired using the Grace TDP criteria (n=8) had neither DPT nor CAO. This conclusion was based on the 6 individuals in whom radiographs were made available to me (see above). Further, if one continues to focus on the group that was said to have DPT and CAO but did not meet impairment criteria but in this instance had a reduced diffusing capacity, other medical conditions can explain the reduction in diffusing capacity in at least two of the four cases in whom radiographs were available. Specifically, one individual had a massive pleural effusion and another had reduced right lung volume; both of these conditions are well known to cause a reduced diffusing capacity. Even when analyzing the other individuals that were classified as having DPT using the Whitehouse definition of not requiring CAO and in whom no impairment was seen, the individual either did not have DPT or had another, non-asbestos related condition such as congestive heart failure (see above). When considering this same group (DPT without CAO who did not meet spirometric impairment), those few individuals with a reduced diffusing capacity (n = 3) did not even have DPT.

In conclusion, the CARD Mortality study has significant selection bias and has important inaccuracies in the chest radiograph interpretations and methods of classifying the changes seen, particularly as it relates to diffuse pleural thickening. As a result of this analysis, I can conclude

that there are no data to suggest that the Grace DPT excludes individuals who are impaired by an asbestos related lung disease. To the contrary, these criteria remain a reasonable and valid way to determine which individuals have physiologically important diffuse pleural thickening.